REMARKS

In response to the above-identified Office action, Applicant has amended claims 1, 4, 21 and 23 and cancelled claim 24. Support for the amendments to the claims can be found in the above-identified application at page 1, lines 6-13, page 3, lines 3-16, page 5, lines 2-6, page 7, lines 10-12, and page 8, lines 10-15. As such, no new matter has been entered by way of these amendments. In view of these above amendments and the following remarks, Applicant hereby requests further examination and reconsideration of the application, and allowance of claims 1-4, 6-21 and 23.

The Office has rejected claims 1-4, 6-21, 23 and 24 under 35 U.S.C. § 112, first paragraph, asserting that "forming a pocketed coil with different pitches in a middle portion between end portions of the spring" (claim 24), "altering the positions of the coiling elements as the wire is fed through the coiling section" (claim 1), "using the programmable control system to alter these positions as the wire is fed through the coiling station" (claim 21), and a "programmable control system having a profile selection system that selects at least one of the data arrays or tables" (claim 1), were allegedly not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the Applicant, at the time the above-identified application was filed, had possession of the claimed invention. In response, Applicant has amended claims 1 and 21 as shown above, has cancelled claim 24, and provides the following remarks.

Applicant submits the specification supports and enables "a programmable control system operably linked to said first and second drives to alter the first positions or the first orientations of said first coiling element and the second positions or the second orientations of said second coiling element relative to the wire feed," as recited in claim 1, and "feeding wire through a coiling section so as to form a coil, wherein the programmable control system alters the positions or orientations of the coiling elements to control a diameter and a pitch of the coil according to the selected data array or table," as recited in claim 21. Applicant respectfully directs the Office's attention to page 3, lines 3-16, in the above-identified application, which discloses:

> The programmable control means preferably comprises a programmable logic controller by which computer-numerical-control (CNC) of the coiling section is achieved. Preferably, **the logic controller actuates drive means, most preferably servo motors, by which the positions and/or orientations of the coiling elements can be altered.**

> Most preferably, control of the coiling unit is exerted by three servo-motors: one for the wire feed rolls, one for a coiling element ("finger") which controls the diameter of the spring, and one for a coiling element ("spreader") which controls the pitch of the spring.
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> Most preferably, the control means stores a number of data arrays or tables which determine the position of the finger and spreader (slave) axes in relation to the position of the feed roller (master) axis, for each spring profile. Suitable tables may be prepared for each spring type to be manufactured, and **the appropriate table selected prior to commencement of manufacture of any particular spring type.**
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> **Each table may consist of many data points, eg several thousand data points, resulting in complete control of the spring being formed** ...

(emphasis added). As each table or data array may store many (e.g., several thousand) data points, the positions and/or orientations of the coiling elements may change according to these data points from a selected table or data array as the wire is fed to form the coil. In view of the foregoing amendments and remarks, Applicant respectfully requests the Office to reconsider and withdraw this rejection.

Additionally, Applicant submits that claims 1 and 21 are distinguishable and patentable over the art of record, including: U.S. Patent No. 4,112,721 to Takase et al. ("Takase"); U.S. Patent No. 5,444,905 to St. Clair ("St. Clair"); and U.S. Patent No. 4,439,977 to Stumpf ("Stumpf"). In particular, neither Takase, St. Clair, Stumpf, nor any other art of record, alone or in combination, disclose or suggest, "a plurality of stored data arrays or tables, each data array or table determines a plurality of the first positions or a plurality of the first orientations of said first coiling element and a plurality of the second positions or a plurality of the second orientations of said second coiling element for a particular coil spring profile," as recited in claim 1, or "providing ... a plurality of data arrays or tables, wherein each of the data arrays or tables determine a plurality of positions or orientations of coiling elements for forming a particular spring profile," as recited in claim 21.

With regard to Takase, Applicant respectfully directs the Office's attention to FIG. 10 and col. 10, lines 46-54, which discloses inputting control data for manufacturing coil springs, such as pitch and diameter data, into a main memory 210 using a keyboard 200. But, there is no mechanism that stores control data for different spring profiles. In a system as disclosed in Takase, each time a different type of spring is desired to be made, different spring profile data would have to be inputted into the memory 210.

With regard to St. Clair, first, there is no teaching nor any suggestion of any type of processing system with memory, let alone a plurality of stored data arrays or tables that determine positions or orientations of coiling elements for each of a plurality of coil spring profiles. Second, Applicant directs the Office's attention to FIG. 14 and col. 6, lines 3-31, which disclose a coil diameter assembly 80 with cams 84, 85 that engage a cam follower 86. The movement of the cam follower 86 is in response to the particular configuration of the cam, which ultimately causes a linkage to move the coil diameter roller 81 according to that configuration. The assembly 80 operates using only one set of cams 84, 85 at a time, and therefore the diameter of the coils is not controlled according to stored spring profiles. Third, and referring now to FIGS. 13 and 15, col. 5, lines 45-54, and col. 7, lines 6-13 in St. Clair, movement of a spreader cam 91 along a horizontal axis in a "Z" direction as wire 15 passes along side the cam 91 affects the degree to which convolutions in the coil are spread apart. The pushing action of a spreader cam 25 engages cam followers 94, 95 for pivoting linkage 96 to cause spreader bar 92, and hence cam 91 shown in FIG. 13, to move forward and rearward for more or less spreading. Thus, the configuration of a particular spreader cam 25 ultimately determines a spring's shape. But, these spreader cams 25 must be replaced to provide different spring shapes, as stated at col. 7, lines 31-34 in St. Clair. Therefore, the spreader cam 91 does not spread apart the convolutions in the coil according to several spring profiles.

With regard to Stumpf, the Office has noted that there are no teachings in this reference which disclose a programmable control means. Accordingly, Stumpf does not disclose a plurality of stored data arrays or tables that determine positions or orientations of coiling elements for each of a plurality of coil spring profiles. As such, the art of record, including Takase, St. Clair and Stumpf, alone or in combination, does not disclose or suggest, a plurality of stored data arrays or tables that determine positions or orientations of coiling elements for each of a plurality of coil spring profiles as claimed. The present invention

provides data arrays or tables that store a plurality of spring profiles as stated at page 3, lines 10-22 in the application. Each of these spring profiles stored in the data arrays or tables include data that determine the position of a finger 4 and a spreader 5 during coiling. Id. The program logic controller 8 can select spring profiles during spring production making it very easy to switch between different spring profiles and to produce springs of differing form in batches. Even if there was a motivation to combine the references of record, such as the Takase, St. Clair and Stumpf references, these combined teachings would still fail to disclose or suggest all of the limitations recited in claims 1 and 21. For the reasons stated above, claims 1 and 21 are distinguishable and patentable over the art of record. Since claims 2-4 and 6-20 depend from and contain the limitations of claim 1, and claim 23 depends from and contains the limitations of claim 21, they are patentable in the same manner as claims 1 and 21.

Additionally, none of the teachings in the art of record, including Takase, St. Clair and Stumpf, alone or in combination, disclose or suggest, "electromagnets engaging each spring as it leaves the coiling unit to substantially dampen excessive oscillation in each spring," as recited in claim 6. Referring to Takase at FIG. 8 and col. 9, lines 1-32, the magnets 138*a*, 138*b* cause the rocker arms 134*a*, 134*b* to move for opening and closing the passage 128 thereby allowing coil spring 28*b* to pass through one of passages 130*a*, 130*b*, 130*c*. But, the magnets 138*a*, 138*b* do not engage the springs 28*b*, and are not intended to dampen oscillations of the springs 28*b*. St. Clair and Stumpf do not teach or suggest using magnets at all, nor any means for dampening excessive oscillations of the coiled springs. Referring to the above-identified application at page 4, lines 9-16, when producing long springs at high speeds, excessive oscillations in the springs can result in machine stoppages. This problem can be reduced or eliminated by dampening excessive oscillations using magnets to engage the springs as they exit the coiling section. As a result, pocketed spring assemblies of greater depth can be manufactured that have increased comfort for users of assemblies, such as mattresses, which incorporate the pocketed springs assemblies. As such, claim 6 is distinguishable over the art of record and is patentable for this additional reason.

Still further, none of the teachings in the art of record, including Takase, St. Clair and Stumpf, alone or in combination, disclose or suggest "the programmable control system ... linked to the encapsulation section, to control movement of material through the encapsulation section," as recited in claim 7. Applicant respectfully directs the Office's

attention to Takase at FIG. 1 and col. 4, lines 4-10, where a microcomputer 80 is disclosed which controls movement of a coiling point 20 and a pitch tool 22 during coil spring formation. But, Takase does not teach the microcomputer 80 controlling movement of a material through an encapsulation section since there is no encapsulation section disclosed in Takase for the microcomputer 80 to control and move the coil spring 28 through. Referring to FIG. 8 and col. 8, lines 57-61 in Takase, the structure and operation of the selecting device 50 arranged within the coil spring manufacturing apparatus in FIG. 1 is illustrated and described. In particular, a coil spring 28*b* is simply dropped into the device 50 once it is cut from the wire 28, and therefore does not proceed to an encapsulation section.

With regard to St. Clair, there is no teaching nor any suggestion of any type of processing system with memory, let alone a programmable control system linked to the pocketing apparatus shown in FIG. 21 to control movement of material through the apparatus. Further, Stumpf does not disclose a programmable control system as acknowledged by the Office, and therefore Stumpf does not teach or suggest a programmable control system linked to an encapsulation section to control movement of material through the encapsulation section. Furthermore, and referring back to Stumpf at FIG. 10 and col. 8, lines 9-39, an inserter plunger 232 is moved by an air cylinder 234, which is activated by the control switch 224, to insert a compressed spring 36 into a fabric strip 26. But, the master timing control 196 (which is not even a programmable control system) does not cause the coil spring 36 to advance from the coiler 38 to the spring compressor assembly 42. Moreover, the timing control 196 does not control movement of the spring from the spring compressor assembly 42 to the spring inserter.

Conventionally, synchronization is achieved by a complex arrangement of cams and gears, as stated at page 1, lines 14-17 in the above-identified application and discussed above in connection with the cited references. Applicant directs the Office to the above-identified application at page 2, lines 13-19, where it states that the programmable control synchronizes operations of the apparatus, thereby eliminating change cams, gears and clutches, for example. As a result, the present invention provides for reducing the time for changing between products to seconds rather than hours. The controlled, synchronized movement of the material from the coiling section to the encapsulation section, and through the encapsulation section, makes this possible. As such, claim 7 is distinguishable over the applied art and is patentable for this additional reason.

In view of all of the foregoing, it is submitted that claims 1-4, 6-21 and 23 stand in condition for allowance and such allowance is earnestly solicited. In the event that there are any outstanding matters remaining in the above-identified application, the Office is invited to contact the undersigned to discuss this application.

Respectfully submitted,

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Date 9/26/03 | Pamela J. Litto